

**Testimony of Rachel Muncrief and John German on behalf of the International Council on
Clean Transportation**

Before the U.S. Environmental Protection Agency Science Advisory Board

May 31, 2018

Washington Plaza Hotel, 10 Thomas Cir NW, Washington, DC

A. Oral Testimony

My name is Rachel Muncrief, and I direct the heavy-duty vehicles program and compliance and enforcement program of the International Council on Clean Transportation. I have a PhD in Chemical Engineering and have been working on vehicle emissions and efficiency policy in the United States for 15 years — 5 years at the ICCT and 10 years at the University of Houston, concluding my time in Houston as a research faculty and director of the university's diesel vehicle testing and research lab. John German is a Senior Fellow at ICCT, with primary focus on vehicle policy and powertrain technology. He started working on these issues in 1976 in response to the original CAFE standards, addressing these issues for about a decade each for Chrysler, EPA, Honda, and ICCT.

Thank you for the opportunity to testify today. I would like to briefly address a few key technical issues raised in the SAB workgroup memo from May 18, 2018 concerning the 2025 light-duty vehicles GHG standards and the emission requirements for glider vehicles. We would like to state up front that we fully support the workgroup's recommendations to move forward with an SAB review of these proposed actions.

On the 2025 GHG standards: The agencies' 2016 Technical Assessment updated their analyses, but still failed to consider a number of technology advances that are already in production or

close to production, overestimated the cost of other technologies, and ignored benefits from features associated with efficiency technology that are desired by consumers.

Existing technologies are being improved and new technology is being developed at astounding rates. ICCT cooperated with suppliers on a series of six technology papers in 2016, examining all aspects of technology development. OMEGA modeling conducted by ICCT in 2017 using updated inputs based on the ICCT/supplier reports found that the cost to comply with the 2025 standards would be only \$866 per vehicle, less than half the projected cost of about \$1,800 in the original rule and a third less than the updated cost of about \$1,300 in the TAR. And even our analysis cannot keep up with the rapid pace of technology introduction – just two examples are Mazda’s introduction of the world’s first gasoline compression ignition engine in 2019 and FCA’s inclusion of a low-cost 48v hybrid system as standard equipment on the 2019 RAM pickup truck with the base V6 engine. Projections that large numbers of full hybrids are required to meet the standards are based upon analyses that artificially and improperly restrict the uptake of conventional technologies.

There is so much conventional technology coming that there are multiple pathways to comply and there is no tradeoff with performance, as manufacturers can simply install additional technology to meet any increase in consumer demand. Plug-in vehicles and full hybrids will not be required to meet the standards, although of course they can be used at the manufacturer’s option.

The TAR failed to even consider other consumer benefits associated with efficiency technology. For example, turbocharged engines and hybrids improve throttle response, transmissions with more gears have smoother shifts and reduce engine noise, and lightweighting improves handling, braking, and performance. NHTSA has also failed to consider the better crash properties of high-strength steel and aluminum in their safety analyses.

Using realistic technology costs, the fuel savings alone offset the increased technology cost. Considering the other consumer benefits from technology, there are no significant barriers to consumer acceptance of redesigned or advanced technology vehicles. In fact, consumers are likely to increase their purchases of new vehicles.

On the emissions impact of glider trucks: According to the EPA's own testing results, in operations typical of tractor-trailer driving, glider trucks emit 30 times the NO_x and 60 times the PM of a modern tractor-trailer equipped with emissions controls. Sales of glider trucks today are around 10,000 per year—5% of the Class 7 and 8 tractor truck market—up over an order of magnitude from 10 years ago. The ICCT conducted our own scenario analysis, which assumed the annual sales volume would steadily grow to 17,400 units by 2027. In that scenario, EPA's proposed regulation would expose US citizens to an additional 1.5 million tons of NO_x and 16 thousand tons of PM emissions over the next decade. In monetary terms, this is equivalent to more than 12 billion dollars in health damages over the next decade.

This proposed regulation would likely also increase fleet-wide CO₂ emissions over the next decade. Although the EPA's testing indicated that the glider vehicle powertrains produced approximately 4-5% lower CO₂ emissions (for typical operation) than the model year 2014/2015 trucks they tested, typical tractor truck fuel consumption will be reduced by around 40% from 2010 to 2027 due to the EPA's Phase 1 and Phase 2 GHG regulations. If glider trucks are not regulated under these regulations, then it is unlikely they will benefit from these mandated improvements in fuel efficiency.

We have submitted more extensive comments in written form. Thank you for your time.

B. Written Testimony

ICCT response to questions posed in the SAB Workgroup memo of May 18, 2018

1. Questions regarding Reconsideration of Final Determination: Mid Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light Duty Vehicles (RIN 2060-AT77)

As requested by the Science Advisory Board, the review below is based upon documents developed by EPA, NHTSA and CARB during the MTE process, such as the Draft Technical Assessment Report, and focus on areas where updates are needed. Specifically, we have addressed the first four questions suggested by the SAB for review.

- What are the barriers (e.g., price and foregone power or safety) to consumer acceptance of redesigned or advanced technology vehicles, and how might such barriers be overcome?

EPA and NHTSA properly accounted for some factors influencing consumer acceptance of technologies needed to comply with the standards in the 2016 TAR, but overestimated technology cost and failed to quantify benefits from features associated with efficiency technology that are desired by consumers. Properly considering all of the factors, there are no significant barriers. In fact, consumers benefit from the standards and they are more likely to increase their purchases of new vehicles. The new and improve technologies required to meet the standards impact customers in four ways:

1. **Increased vehicle price.** The technology cost estimates in the TAR do not account for the latest technology developments and, thus, are overstated. Certainly, the cost to meet the standards is significant. However, it is important to understand that existing technologies are being improved and new technology is being developed at astounding rates, which is rapidly reducing the projected cost to comply with the standards. EPA analyses for the 2012 rule establishing 2017-2025 standards found that the cost of meeting the 2025 standards versus the 2015 baseline vehicles would be about \$1,800 per vehicle. EPA updated their analyses for the 2016 Proposed Determination and found that the cost had dropped to about \$1,300 per vehicle. However, even the 2016 analyses understated technology development and, thus, overstated the costs to comply. ICCT cooperated with suppliers on a series of six technology papers in 2016, examining all aspects of technology development (see attachment for links). These reports found that the TAR failed to consider a number of technology advances that are already in production or close to production—such as E-boost, dynamic cylinder

deactivation, variable compression ratio, and numerous thermal management strategies—and continued to overestimate the cost of other technologies. OMEGA modeling conducted by ICCT in 2017 using updated inputs based on the ICCT/supplier reports, found that the cost to comply with the 2025 standards would be only \$866 per vehicle. Further, despite the best efforts of the agencies, suppliers, and the ICCT, recent announcements from Toyota, Mazda, GM, FCA, and Volvo have already made the updated technology assessments of the past year obsolete, as the industry continues to play technology leapfrog at an astounding rate. The redesigned 2018 Toyota Camry with the base engine has incorporated many technology improvements and improved fuel economy by 26% over the previous generation, already meeting its 2022 footprint target without any hybridization, lightweighting, or off-cycle credits. Mazda is introducing the world's first gasoline compression ignition in 2019 with up to a 30% improvement in efficiency, which was not considered in the 2016 TAR – and has announced it is developing plans for a future engine with an astounding 56% thermal efficiency. GM is introducing the world's first dynamic cylinder deactivation system on their 2019 full-size pickup trucks with twice the benefit of conventional cylinder deactivation, which also was not considered in the 2016 TAR. Finally, FCA is making a 48v hybrid system standard equipment with the base V6 engine on the 2019 RAM pickup truck and Volvo will make 48v systems standard on every model they redesign starting in 2019. **It is clear that the cost to comply with the 2025 standards will be less than half the cost estimated when the standards were adopted in 2012. Further, there is so much technology coming that manufacturers can pick from several different compliance pathways.** Toyota and Mazda are clearly on a path to comply primarily with naturally aspirated engines; some combination of high-compression ratio Atkinson cycle engines and gasoline compression ignition. Ford and Honda are clearly choosing to use downsized, turbocharged engines to comply. FCA is an early leader on 48v hybrid systems. Lightweighting is also being used for vehicles from a variety of manufacturers. Meeting the standards will not be difficult and will not be constrained to a single set of technologies.

2. **Fuel savings.** Consumer fuel savings are accurately modeled by EPA, NHTSA, and CARB. Even with the lower fuel prices since 2012, the fuel savings are still 2.4 times larger than the 2016 TAR technology cost and 3.6 times larger than the 2017 ICCT cost. However, an important issue with respect to consumer acceptance of technology is how much of the fuel savings are valued by new vehicle purchasers. New vehicle purchasers are not the same and some value the fuel savings higher than others. Even the vehicle manufacturers acknowledge that most customers value 2-3 years of fuel savings and other analyses find that consumers value about 5 years of fuel savings on average. Using the 2016 TAR costs, the fuel savings would pay back the technology costs in about 4.5

years and the pay back would be about 3 years with the 2017 ICCT costs. **Thus, for most customers the fuels savings alone would offset the increase in vehicle price.** Also note that these payback periods are significantly shorter than the average new vehicle loan of 5.5-6.0 years, meaning that the fuel savings would more than pay for the increased monthly loan payments.

3. **Foregone consumer attributes**

- a. **Performance.** The TAR appropriately determined that consumer value of performance is independent of the standards and set the standards assuming constant performance. While many technologies can be used to boost both performance and efficiency, it is inappropriate to directly trade off consumer preferences for performance and fuel economy against each other. If consumers wish to purchase more performance, manufacturers can satisfy this demand and still meet the standards by installing additional technology – there is plenty of technology available to do both. Further, recent computer simulation modeling suggests that when newer technologies are used to boost performance, the reduction in fuel economy is smaller than with older technologies. Finally, consumer demand for performance improvement is subject to diminishing marginal returns, i.e. many mainstream vehicles are already faster than most customers will ever use and consumer demand is leveling off.
- b. **Safety.** The large majority of the fuel economy and GHG reductions are achieved with powertrain technology. Prominent examples include downsizing engines for better efficiency while maintaining performance with turbocharging, improved transmissions and additional gear ratios, higher compression ratio for higher efficiency, Atkinson cycle engines that extract more useable work from combustion, and hybrids (mainly for Japan in terms of market share). But these are just the main ones – there are a host of other technologies that also improve efficiency. In addition, there are improvements in aerodynamic design to reduce drag, reductions in tire rolling resistance, and higher efficiency accessories and pumps. None of these affect safety in any way. Only lightweighting, which is an important but still relatively minor part of the overall efficiency improvements, affects safety. High-strength steel and aluminum, are increasingly employed in new vehicle designs not just because they are lighter and help comply with fuel economy and GHG standards, but because they have better crash properties than conventional steel and help improve NCAP scores. **These better crash properties are not reflected in NHTSA’s traditional vehicle safety analyses,** which are based upon historical data.

4. **Other consumer attributes. The TAR failed to quantify benefits from features associated with efficiency technology that are desired by consumers.** These consumer

welfare gains are very significant and the agencies arbitrarily failed to consider them.

Examples include:

- a. Lightweighting improves maneuverability, performance, and braking and increases cargo and towing capacity. Note that improved maneuverability and braking also decrease the chances of an accident.
- b. High-strength steel and aluminum have better crash properties than conventional steel and their use improves vehicle safety.
- c. Both increasing the number of transmission gears or using a Continuously Variable Transmission reduce noise on the highway (by allowing the engine to run at lower speeds), provide smoother shifting, and improve performance (by keeping the engine closer to its peak power speed).
- d. Both turbocharging or hybrid electric motors provide faster throttle response and increased torque at low engine speeds for better drivability.
- e. Window glazing keeps the vehicle cooler when sitting in the sun.

Summary: All four of these factors affect consumer purchase decisions and all must be analyzed and incorporated in order to properly assess barriers to consumer acceptance of redesigned or advanced technology vehicles. The fuel savings alone offset the incremental technology cost for most customers. Many of the efficiency technologies offer other attributes valued by consumers – and manufacturers will incorporate these benefits into their future product plans. **When all of the benefits are considered, the standards provide incentives, not barriers, for consumers to purchase new technology vehicles.** A prime example of this is the Ford F150 pickup truck, for which V6 engines outsell V8 engines three to one (72% versus 24%),¹ primarily because the 3.5L turbocharged V6 engine has more torque and towing capacity than the 5.0L V8. Also note that there are multiple pathways to compliance

Misinterpretation of EPA Manufacturer Performance Report Trends²: On average, manufacturers exceeded the standards every year from 2010 through 2015. But the margin over the standard decreased from 2014 to 2015, and for 2016 the average fell below the average standard level for the first time, by 9 gCO₂/mile. Note that most of the compliance shortfall in 2016 is due to expiration of flexible-fuel vehicle credits after 2015, but the compliance margin still fell from 13 gCO₂/mile in 2014 to 6 in 2015 to approximately 0 in 2016. complying with the standards every single year would be a high-cost compliance strategy, and the regulations are designed specifically around that fact. Every year a manufacturer exceeds

¹ Michael Wayland, “Downsized engines a test for GM pickups”, Automotive News, May 21, 2018.

<http://www.autonews.com/article/20180521/RETAIL01/180529961/gm-pickup-cylinder-silverado-sierra>

² EPA Greenhouse Gas (GHG) Emission Standards for Light-Duty Vehicles: Manufacturer Performance Report for 2016 Model Year. <https://www.epa.gov/regulations-emissions-vehicles-and-engines/greenhouse-gas-ghg-emission-standards-light-duty-vehicles>

the standards, it generates credits that can be used in the future. In total, manufacturers had accumulated credits of about 285 million Mg (Mg = million grams) of CO₂ at the conclusion of the 2015 model year. A [2017 report](#) from Resources for the Future estimated that GHG credits are worth \$42 to \$63 per Mg, so the total value of the credits accumulated through 2015 is roughly \$12 billion to \$18 billion dollars. Certainly, automakers want to maintain a cushion to handle unexpected events-that's part of the rationale for the credit system. But they can save billions of dollars by slowing down the rate of technology introduction and market penetration in order to under-comply at certain points and use up most of these valuable credits.

Manufacturer use of stockpiled credits to save money in no way affects the technology available in the future to comply with the 2022-2025 standards, as discussed above.

- Would or could there be a significant “rebound” effect from the deployment of new fuel efficient (and lower GHG-emitting) vehicles, and how might such an effect be mitigated?

The agencies evaluation of the rebound effect in the 2016 TAR is appropriate and based upon the best available data. The rebound effect is not fixed. Vehicle owners adjust how much they drive based upon how much they value their time and the marginal cost of driving. The value of time goes up as disposable income increases, such that economic growth causes owners to value the benefits of driving more highly and making the cost of driving relatively less important, thus decreasing the rebound effect. Improving vehicle fuel economy decreases the marginal cost of driving, making any further reductions in fuel consumption relatively less important and decreasing the rebound effect. Economic growth is projected to continue into the future and baseline vehicle fuel economy is improving due to standards already adopted for 2011 to 2021. Thus, **the rebound effect will continue to decrease in the future and is likely to be well under 10% by 2025**. Also note that owners would not drive more if they did not perceive economic benefits to the additional driving, which should also be incorporated into analyses of the rebound effect.

- Would requirements for more fuel efficient new vehicles lead to longer retention of older less fuel efficient vehicles and, if so, would this significantly affect projected emission reductions and have effects on crash-related safety?

The answer here is similar to the answer to the question on the barriers to consumer acceptance of redesigned or advanced technology vehicles. **Due to the value placed by consumers on fuel savings and other consumer features, requirements for more fuel efficient new vehicles lead to increased new vehicles sales and shorter retention of older vehicles.** This, in turn, would lead to more emission reductions and improved safety.

- What proportion of vehicle electrification, particularly for plug-in vehicles including plug-in hybrid electric vehicle (PHEV) and battery electric vehicles (BEVs), would be needed to achieve fleet average GHG emission reductions?

The amount of conventional technology that has already been developed and is being introduced into production is much higher than projected by the agencies in the 2016 TAR. This means that **no sales of plug-in vehicles or full hybrids are needed to achieve the 2025 fleet average emission reductions**. Certainly, a manufacturer may decide that plug-in vehicles or full hybrids are a more cost-effective solution and use them to reduce the amount of conventional technology needed to comply, but this is a choice, not a requirement. Certain manufacturers that sell upscale vehicles with higher performance and more features that add weight, such as BMW and Mercedes, may need a reasonable number of 48v hybrid systems to compensate for the added weight and performance, but 48v hybrid systems are only about a third the cost of full hybrids. Note that manufacturer claims that large numbers of full hybrids are required to meet the standards are based upon analyses of historical technology that artificially restrict the available technologies, such that hybrids are the only path to compliance. This is simply a function of the artificial restriction of conventional technology.

ICCT/supplier working papers

- <http://www.theicct.org/lightweighting-technology-development-and-trends-us-passenger-vehicles>
- <http://www.theicct.org/downsized-boosted-gasoline-engines>
- <http://www.theicct.org/automotive-thermal-management-technology>
- <http://www.theicct.org/PV-technology-transmissions-201608>
- <http://www.theicct.org/naturally-aspirated-gas-engines-201606>
- <http://www.theicct.org/diesel-engines>
- <http://www.theicct.org/hybrid-vehicles-trends-technology-development-and-cost-reduction>

ICCT technology briefs

- <http://www.theicct.org/lightweighting-technology-developments-briefing>
- <http://www.theicct.org/downsized-boosted-gasoline-engines-briefing>
- <http://www.theicct.org/tech-brief-thermal-management-technology-nov2016>
- <http://www.theicct.org/transmissions-techbrief-oct2016>
- <http://www.theicct.org/naturally-aspirated-engines-techbrief-jun2016>
- <http://www.theicct.org/diesel-tech-developments-tech-brief>

Other ICCT technology assessments and modeling

- http://www.theicct.org/sites/default/files/publications/PV-LCV-Powertrain-Tech-Analysis_FEV-ICCT_2015.pdf
- <http://www.theicct.org/next-generation-electric-vehicle-technologies>
- <http://www.theicct.org/US-2030-technology-cost-assessment>
- <https://www.theicct.org/blog/staff/technology-leapfrogging>
- <https://www.theicct.org/publications/how-things-work-omega-modeling-case-study-based-2018-toyota-camry>
- <https://www.theicct.org/blog/staff/us-fuel-economy-trend-reflects-business-strategy-not-tech-challenge>
- https://www.theicct.org/sites/default/files/publications/US-LDV-Efficiency-Consumer-Benefits_ICCT_Briefing_21062017_vF.pdf

2. Questions regarding Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits (RIN 2060- AT79)

- How do these emission rates compare to those of conventionally manufactured trucks that are: (a) new; and (b) used at prices comparable to the purchase price of a “new” glider truck? What are key sources of variability and uncertainty in the comparisons?

Note that the way this question is worded seems to assume that glider trucks are not new trucks. It should be made very clear that the entire chassis of a glider truck is new and from the outside a glider kit would be indistinguishable from a new truck. That being said, Figure 1 below shows how the EPA certified emissions limits have changed in the US since the mid-90s, NO_x and PM emissions have both been reduced by over 90%. The engine inside a typical glider truck is what is known as “pre-emissions”, this means that there is no emissions control system in place to reduce NO_x and PM emissions. Conversely, emissions from 2010 and newer heavy-duty diesel engines have sophisticated emissions control, including technology known as exhaust gas recirculation (EGR), selective catalytic reduction (SCR), and diesel particulate filters (DPF). Information about these technologies, how they work, and the estimated costs of such technologies can be found in the ICCT report titled “COSTS OF EMISSION REDUCTION TECHNOLOGIES FOR HEAVY-DUTY DIESEL VEHICLES³”.

³ <https://www.theicct.org/publications/costs-emission-reduction-technologies-heavy-duty-diesel-vehicles>

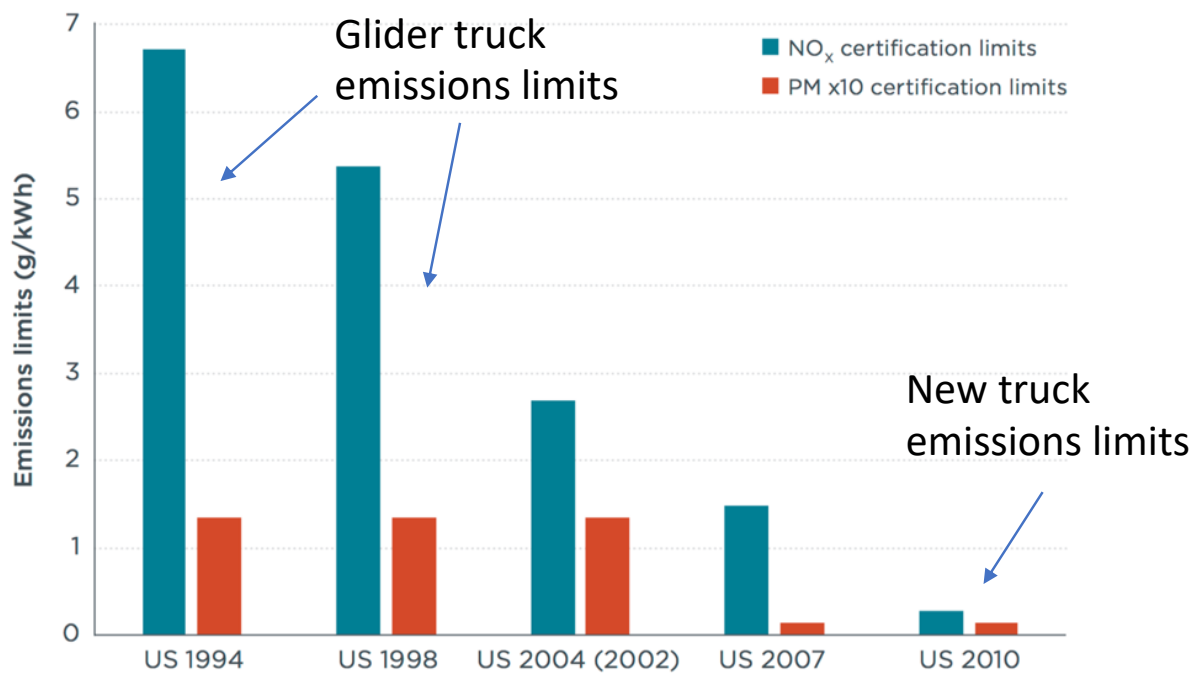


Figure 1. EPA emissions NO_x and PM standards for heavy duty diesel engines

It is technically impossible for a vehicle with no emissions control system to have NO_x and PM emissions comparable to that of a truck with a functional emissions control system. That being said, it should be noted that SCR systems require a minimal exhaust temperature to function optimally. In low load and low speed driving conditions (such as urban driving) it is possible to see an increase in NO_x emissions from heavy duty vehicles equipped with an SCR system.

It is commonly discussed that glider trucks cost approximately 25% less to purchase than a new, emissions compliant, truck. It is also likely that the maintenance costs of a glider truck are lower due to the fact that there is less sophisticated technology to maintain. It is challenging to determine which model year used truck would be seen as “cost equivalent” comparison to a new glider truck. That being said, fleets that purchase new trucks typically keep their trucks for anywhere between 4-8 years, on average. Therefore, the second hand truck market is likely to be made up of trucks that fall under the latest (2010) emissions standard, making the average used truck significantly cleaner than a glider truck.

- What is the range of possible market penetration of glider trucks into the onroad heavy duty vehicle stock? What is the effect of glider truck penetration into the market on fleet level

emissions at national, regional, and local scales in the near-term and long-term, compared to the status quo?

It is extremely difficult to predict what the market penetration of glider trucks will be in the future. However, we do know that glider trucks currently account for around 5% (10,000 units annually) of the Class 7 and 8 tractor truck market and we also know that sales of glider trucks are up over an order of magnitude from 10 years ago. Sales of glider trucks began a rapid rise in response to the new EPA emissions standards that began phasing in in 2007. Without a regulation in place to curb the sale of glider trucks, there is no reason to believe that sales of these trucks would decrease in future years. In fact, we believe it is likely that sales of these glider trucks would continue to rise in the absence of a regulation. For our national level analysis (which is detailed further in the appendix of this document) we chose to select a conservative assumption that the annual sales volume would steadily grow to 17,400 units by 2027. In that scenario, EPA's proposed regulation to repeal the glider kit ban would expose US citizens to an additional 1.5 million tons of NO_x and 16 thousand tons of PM emissions over the next decade, that they would not be exposed to otherwise. To put this in monetary terms, this is equivalent to more than 12 billion dollars in health damages over the next decade. We have not conducted an analysis of the impacts at the regional and local scale.

- What are implications of changes in emissions in the near-term and long-term from the penetration of glider trucks with regard to GHG emissions, air quality, air quality attainment, and human health, compared to the status quo?

As previously mentioned we predict the health damages that would be caused by this proposal over the next decade to be more than 12 billion dollars. NO_x and PM from diesel exhaust are extremely toxic. The American Cancer Society lists diesel exhaust as a Group 1 known carcinogen to humans, alongside things like asbestos and radiation. In addition to lung cancer, long-term exposure to diesel exhaust has been linked to stroke, heart disease, pulmonary disease, chronic respiratory illnesses, asthma, bronchitis, and infections. The US citizens most likely to be impacted by the hazardous effects of diesel exhaust are children, the elderly, the sick, and the poor.

Although we have not done extensive analysis on the fleet-wide CO₂ emissions impact of the proposed glider regulation, we do point out that this proposed regulation would likely increase fleet-wide CO₂ emissions over the next decade as compared to a scenario in which the proposal

is not finalized. This is due to the fact that although the EPA's testing⁴ indicated that the glider vehicle powertrains produced approximately 4-5% lower CO₂ emissions (for typical operation) than the model year 2014/2015 trucks they tested, typical tractor truck fuel consumption will be reduced by around 40% from 2010 to 2027 due to the EPA's Phase 1 and Phase 2 GHG regulations. If glider trucks go unregulated then it is unlikely they will benefit from these mandated improvements in fuel efficiency.

⁴ <https://www.regulations.gov/document?D=EPA-HQ-OAR-2014-0827-2417>

**Appendix: ICCT Written Comments on Proposed Rule: Repeal of Emission
Requirements for Glider Vehicles, Glider Engines, and Glider Kits**

January 4, 2018

RE: Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits;
Proposed Rule

The International Council on Clean Transportation (ICCT) would like to take the opportunity to provide comments on the U.S. Environmental Protection Agency's proposal entitled, *Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits*. The ICCT is an independent nonprofit organization founded to provide unbiased research and technical analysis to governments in major vehicle markets around the world. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, as well as their fuels, in order to benefit public health and mitigate climate change.

The subsequent comments elaborate on the ICCT's oral and written testimony at the agency's public hearing on December 4, 2017.

We would be glad to clarify or elaborate on any points made in the attached comments. If there are any questions, EPA staff can feel free to contact our Heavy-Duty Vehicle Program Director, Dr. Rachel Muncrief (rachel@theicct.org).

Best regards,

A handwritten signature in dark ink, appearing to read "Drew Kodjak", with a stylized, flowing script.

Drew Kodjak
Executive Director
International Council on Clean Transportation

ICCT Comments on Proposed Rule: Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits

Background

Glider trucks consist of a new vehicle chassis into which an older re-manufactured engine has been installed. A decade ago, sales of glider trucks in the US were mostly limited to vehicles that had been in an accident that left the body unrepairable, but the powertrain still intact. Over the past 10 years, sales of glider kits have increased exponentially as a deliberate attempt by glider kit manufacturers and assemblers to circumvent emissions control regulations. In the Phase 2 Heavy Duty Vehicle Greenhouse Gas regulation, the EPA sought to cap and eventually disallow the sale of glider trucks equipped with engines that are not compliant with current emissions standards. This proposal would remove that provision from the Phase 2 regulation.

Based on ICCT's analysis of this regulation, the EPA reached the correct conclusion in the Heavy-Duty Vehicle Phase 2 Greenhouse Gas regulation. It is our position that the limitations on glider trucks sales set in that regulation should be kept in place unaltered. ICCT is strongly opposed to the EPA's proposal to repeal the emission requirements for glider vehicles for the following reasons:

- This regulation would cause US citizens to be exposed to an additional 1.5 million tons of NOx over the next decade.
- This proposal would cause US citizens to be exposed to an additional 16 thousand tons of PM 2.5 emissions over the next decade.
- This proposal would cost US citizens more than 12 billion dollars in health damages over the next decade.
- This proposal would set a precedent for the creation of a massive loophole that could potentially undo all current and future vehicle emissions control regulations, by declaring that EPA does not have the authority to regulate any vehicle with a single used component.

ICCT has previously submitted public comments⁵ to EPA regarding our concerns over the loophole that has allowed the unchecked and rapid growth of glider kits over the past decade. Those comments are included here for reference as they are still relevant:

The ICCT recommends that the agencies ensure there are no regulatory loopholes whereby increasing unforeseen numbers of trucks exploit regulatory exemptions to

⁵ October 1, 2015: Comment submitted by Drew Kodjak, Executive Director, International Council on Clean Transportation (ICCT) Comment on the Environmental Protection Agency (EPA) Proposed Rule: Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles; Phase 2. <https://www.regulations.gov/document?D=EPA-HQ-OAR-2014-0827-1180>

avoid deploying emission reduction and efficiency technology. The ICCT spends a considerable amount of time investigating gaps between policy objectives and their market outcomes. The U.S. exemption for gliders (i.e., “glider kits”, “gliders”, or “glider vehicles”) in the criteria pollutant heavy-duty vehicle regulations is among the more egregious and high-risk regulatory gaps. The glider kit provision that was previously used to assist in bringing hundreds of repaired vehicles per year is now creating an entirely new market with tens of thousands of sales per year, now with multiple suppliers competing in the space. This glider market is predicated upon reduced costs from vehicles that are not regulated and not certified through the full process that most modern tractors are. This is a clear distortion of the market and the exploitation of a regulatory provision that was not foreseen to be used in such a way. We recommend that the agencies’ include glider kit-manufactured vehicles within the greenhouse gas emission and efficiency regulations, as well as criteria pollutant emission regulations as soon as possible. Exemptions, if granted, would ideally be restricted to a number that is consistent with pre-emission-regulation glider production – on the order of hundreds of units per year industry wide – and only those with legally or insurance-verified evidence of inoperably damaged tractor frames.

Emissions Impact

EPA has sought comment on the following: *EPA also solicits comment and information on whether limiting the availability of glider vehicles could result in older, less safe, more-polluting trucks remaining on the road that much longer. EPA particularly seeks information and analysis addressing the question whether glider vehicles produce significantly fewer emissions overall compared to the older trucks they would replace.*

The phrasing of EPA’s solicitation for comments is odd. As older vehicles reach the end of their useful life and are retired, they are replaced by new vehicles which meet strict emissions and safety standards. Glider trucks are sold and marketed as an alternative to purchasing a new vehicle with a modern, emissions compliant, engine. It is illogical to compare glider trucks with the vehicles that they are replacing. The correct comparison would be to compare new glider trucks with new trucks that meet modern emissions and safety standards.

EPA did not conduct any impact assessment or cost benefit analysis for this proposal. From ICCT’s perspective this is highly unusual, and a major defect in the proposal. We are not aware of any previous EPA regulation that failed to consider air quality and health impacts as well as costs and benefits.

The ICCT did conduct our own analysis. Our findings are detailed below.

Emissions from glider trucks, which are sold and marketed as new trucks, are much higher than emissions from all other new trucks because the engines in glider trucks are not equipped with the modern emissions controls that new engines utilize. As noted in EPA’s letter dated

December 1, 2017 to Tom Brewer of Tennessee Tech University⁶, *“OEMs have nearly universally utilized significant degrees of advanced technology to achieve the 2010 and later standards, including but not limited to electronic fuel injection systems at a level of manufacturing quality and design limits which did not exist in the 1998-2002 time frame, turbocharger technology at a level of manufacturing quality and design limits which were not utilized in the 1998-2002 time frame, cooled exhaust gas recirculation technology, diesel particulate filter technology, and SCR-based NOx catalysts.”*

According to chassis dynamometer testing conducted by US EPA's National Vehicle & Fuel Emissions Laboratory⁷, in operations typical of tractor-trailer driving, that is a 95% weighting of highway activity (55 and 65 mph cycles) and 5% weighting of transient activity (ARB transient) for a test vehicle with a combined weight of 60,000 pounds (including the tractor, trailer, and payload), glider trucks emit 30 times the NOx and 60 times the PM of a modern tractor-trailer. Sales of glider trucks today are around 10,000 per year—5% of the Class 7 and 8 tractor truck market—up over an order of magnitude from 10 years ago. If these numbers continue to grow, even at a moderate pace, (to 17,400 units per year in 2027) EPA's proposed regulation would expose US citizens to an additional 1.5 million tons of NOx and 16 thousand tons of PM emissions over the next decade, that they would not be exposed to otherwise. To put this in monetary terms, this is equivalent to more than 12 billion dollars in health damages over the next decade.

ICCT's analysis was done using EPA's own emissions testing data, EPA's MOVES model estimates of annual vehicle sales and vehicle miles traveled, and EPA's published estimates of damages per ton of direct emissions from on-road mobile sources. Therefore, we are confident that if EPA had done an impact assessment of this proposal the results would be close to ours. More details of our analysis can be found in a recent ICCT blog that can be found on our website⁸ and is also attached as an appendix to this document for further reference.

Note that the extra NOx emissions caused by this proposal, if it is finalized, will be 13 times what the impact of the Volkswagen defeat device scandal would have been if EPA hadn't caught VW cheating (something in which my organization played a small but important part). VW's deception has cost that company over 20 billion dollars in fines in the U.S. It would be inconsistent and destructive for the EPA, having helped to penalize one company for evading a reasonable emissions regulation, to then turn around and rescind another regulation specifically for the purpose of enabling a small number of other companies to profit by harming Americans' health and environment in the same way.

⁶ EPA Response E-mail to Tennessee Tech Regarding EPA Test Procedures 11.28.17, <https://www.regulations.gov/document?D=EPA-HQ-OAR-2014-0827-4272>

⁷ HD Chassis Glider Final Report 11202017, <https://www.regulations.gov/document?D=EPA-HQ-OAR-2014-0827-2417>

⁸ Muncrief and Miller, “Scott Pruitt's EPA wants to resurrect the dirty diesel”, The ICCT, Dec 2017. <https://www.theicct.org/blog/staff/glider-proposal-means-resurrecting-dirty-diesel>

Although the EPA did not conduct an impact assessment as part of the development of this proposal, emissions and resulting health impacts are mentioned in various places throughout the document.

1. Section II, Part C. EPA's proposal cites a petition submitted by the glider industry which claims that glider truck emissions are lower than the EPA's original analysis (conducted as part of the development of the HDV GHG Phase 2 Regulation) originally suggested. This claim by the glider industry was based on a study conducted by Tennessee Tech University. ICCT has analyzed the publicly available information on this study and found the study to lack technical credibility for a number of reasons (1) the TTU study did not measure PM emissions which was one of the two pollutants it claimed to assess, (2) the TTU study did not report emissions of NOx from its study except to say that the NOx emissions they measured ranged from 2 to 32 times the emissions limit for modern engines, (3) the TTU study claimed to find that "glider kit HDVs would emit less than 12% of the total NOx and PM emissions" for all Class 8 HDVs, not the one-third of all NOx and PM that EPA estimated. However, they gave no explanation of how they came to this conclusion—no information about what glider truck sales volume they assumed, no information about what NOx and PM emissions level they assumed for the glider trucks, and no information about what year their calculations reflect, (4) these results are in direct contrast with emissions testing results published by the EPA themselves (as referenced above) which found that glider truck emissions are significantly higher than emissions from modern diesel trucks, (5) as confirmed by EPA (referenced above) it is not technically feasible for a glider truck engine with no emissions control to have emissions comparable to a modern, emissions compliant, engine. More details of our analysis of the TTU study can be found in a recent ICCT blog that can be found on our website⁹ and is also attached as an appendix to this document for further reference.
2. Section V, Part 8. Here EPA argues that Executive Order 13044 "Protection of Children from Environmental Health Risks and Safety Risks should not apply since the proposal is not an "economically significant regulatory action". An economically significant regulatory action is defined as having "*an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;*". It is not possible for EPA to have concluded that this proposal does not constitute an economically significant action due to the fact that, as previously mentioned, no impact assessment was performed by EPA. ICCT's analysis found that this proposal would result in more than 12 billion dollars in health damages over the next decade, an average of over 1.2 billion dollars per year which far surpasses the threshold for economic significance. Therefore, it is our belief that EO 13045 should apply.

⁹ Muncrief, "Glider industry petition in support of glider trucks debunks itself", The ICCT, Dec 2017.
<https://www.theicct.org/blog/staff/glider-industry-petition-support-glider-trucks-debunks-itself>

EO 13045 dictates that each Federal agency:

- (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and
- (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Again, EPA did neither by neglecting to perform an impact assessment of their proposal. In fact, EPA acknowledges in their proposal that “some benefits for children’s health...would be lost as a result of this action.” Ideally, EPA would reconsider this proposal to ensure it is in line with EO 13045.

3. Section V, Part 11. In this section EPA addresses compliance with Executive Order 12898: “Federal Actions to Address Environmental Justice in Minority Populations, and Low-Income Populations”. EPA notes that it did no additional analysis to consider how this proposal might impact minority or low-income populations. This again points to the highly unusual choice by EPA to not conduct an impact assessment for this proposal. As ICCT’s analysis has shown, the proposal will result in US citizens being exposed to an additional 1.5 million tons of NO_x and 16 thousand tons of PM emissions over the next decade. These emissions exposures will be disproportionately felt by those living closer to roadways and those living in urban centers. As EPA discusses in Section VIII.A of the Phase 2 HDV GHG Regulation “on average, populations near major roads have higher fractions of minority residents and lower socioeconomic status”. ICCT believes that EPA should conduct an assessment to determine the impact this proposed regulation would have on minority and low-income populations.

Legal Analysis

As stated in Section III, Part A, the proposal to overturn the glider truck provisions is based on one argument: that EPA has reinterpreted the Clean Air Act and determined that glider trucks should not be classified as “new motor vehicles”, and therefore EPA does not have authority under the CAA to regulate glider trucks and their engines. This is an unreasonable and impermissible interpretation of the Clean Air Act for a number of reasons. ICCT has coordinated with legal counsel to conduct a legal interpretation of the EPA’s rationale for the statutory reinterpretation in this proposal. This legal document is attached as an annex to our comments. Below is a “lay person” summary of the legal counsel’s findings.

In the Phase 2 HDV GHG Regulation, EPA presented a detailed summary as to where they derive their authority to enact the regulation including the authority to regulate emissions from glider trucks. This summary is presented in Section I.E.(1) (81 FR 73512-73519) of the regulation.

In short EPA's authority is derived from Title II of the Clean Air Act, which covers emissions from mobile sources. The CAA states that EPA has authority to regulate (1) pollutants from new motor vehicles, (2) pollutants from engines in new motor vehicles, and (3) pollutants from rebuilt heavy-duty engines. In the Phase 2 regulation EPA argues that (1) gliders fit the definition of a new motor vehicle due to the fact that they are sold and advertised as new and that the purchaser of the glider truck takes the initial title to that truck, (2) although the glider engine is a used part, that does not limit EPA from regulating its emissions once it is placed in a new truck since the CAA simply defines "new motor vehicle engine" as an engine in a "new motor vehicle" and does not exclude used engines from being considered as new in this context, (3) notwithstanding the previous two arguments, all engines being used in glider trucks are rebuilt engines and the EPA has explicit authority in the CAA to regulate pollutants from rebuilt engines.

In this proposal to repeal the emissions requirements for glider trucks, EPA attempts to argue that Congress did not specifically consider glider trucks when they defined "new motor vehicle" under Title II of the CAA. EPA argues that the definition of new motor vehicle used in the CAA was very similar to the definition already being used in the Automobile Information Disclosure Act (AIDA) of 1958. And that being the case, they believe that in the CAA Congress at the time only intended new motor vehicles to mean "showroom new" vehicles and not new vehicles with used/rebuilt engines.

EPA's argument is faulty for a number of reasons

- (1) EPA possesses explicit authority under the clean air act to regulate emissions from rebuilt engines. This authority is never challenged or even mentioned in EPA's proposal.
- (2) Glider vehicles are initially titled when sold to the ultimate purchaser, and are explicitly advertised as such. EPA never argues otherwise. Therefore, glider vehicles are new motor vehicles as defined by the straightforward definition given in the CAA: "a motor vehicle the equitable or legal title to which has never been transferred to an ultimate purchaser."
- (3) Under Title II of the CAA Congress explicitly allowed that new motor could include used parts including used engines.
- (4) At the time of passage of the CAA, glider vehicles did exist and were considered new vehicles by the IRS for federal excise tax purposes.
- (5) AIDA and the CAA were enacted for completely different purposes and there is no evidence presented that Congress was informed by AIDA when developing the CAA. The purpose of AIDA was to address fraud occurring in the showroom of new car dealers. Therefore, AIDA only covered a subset of new automobiles (those that are delivered by manufacturers to new car dealers) and does not cover the broad range of vehicles (including cars sold directly to the end user by the manufacturer, trucks, ships, construction equipment, etc) covered under the CAA.
- (6) For a reinterpretation such as this to be permissible it must serve the statute's objectives (protecting the public health and welfare). In this case the statute in question is Title II of the CAA. EPA presents no evidence as to how this reinterpretation could serve the objectives of the CAA.

ATTACHMENTS

Glider industry petition in support of glider trucks debunks itself

Posted Wednesday, 29 November 2017, 17:32

Rachel Muncrief

It's not the most important or even the worst thing about the Pruitt EPA's proposal to reverse course on closing a loophole in the emissions regulations for heavy-duty vehicles that left "gliders"—that is, a remanufactured engine in a new chassis—uncovered. But the summary of a "study" that the glider industry submitted to EPA to support its claim that the agency was wrong in the first place about how dirty gliders are is fingernails-on-a-chalkboard aggravating to us at the ICCT. It's sketchy work presenting partial information as though it's serious and credible technical analysis meant to honestly inform a public debate, when its real effect is to obfuscate and confuse.

We'll have more to say about the consequences of the Pruitt EPA's proposal. For now I just want to briefly point out why this part of justification being offered for reversing EPA's earlier action is bogus.

The remanufactured engines used in gliders are most often what's known as "pre-emissions"—that is, built in the 1990's and early 2000's, before regulation set strict limits on nitrogen oxide (NOx) and particulate matter (PM) emissions (and other pollutants) in new heavy-duty diesel engine exhaust. A decade ago there were a few hundred gliders built annually in the entire U.S., to deal with cases where something (like an accident) wrecked a truck chassis but left the powertrain usable. Today, annual sales of gliders are over 10,000 units, approximately 5% of all the Class 7 and 8 tractor sales, according to the best estimates we have, and climbing fast. The reason for that surge in sales was pretty obviously people wanting to evade the emission control standards.

So when the EPA put out Phase 2 of the HDV greenhouse gas rule, in 2014, it also limited glider sales, to ensure that the air quality and health benefits from the NO_x and PM limits for heavy diesel engines were not undermined. At the time, EPA estimated that without a sales cap glider emissions would represent “about one third of all NO_x and PM emissions from heavy-duty tractors in 2025.” That estimate reflected assumptions that gliders, in the absence of any restrictions, would continue to be about 5% of the heavy-duty tractor fleet and that “gliders emit at the level equivalent to the engines meeting the MY 1998–2001 standards since most glider vehicles currently being produced use remanufactured engines of this vintage.”

The glider industry's bid to overturn the limit on sales rests in part on an argument that EPA should not have assumed that emissions from a remanufactured engine installed in a new chassis would be on par with the emissions standard from the year the engine was manufactured. And they submitted a letter from the president of Tennessee Technological University saying that a study of heavy-duty engine emissions done there purportedly cast doubt on EPA's emissions calculations.

No complete report of this Tennessee Tech study seems to be available anywhere, so all we have to go on is the four-page summary included as an exhibit in the industry ("petitioner's") request to EPA. And it's rife with unexplained claims and contradictory statements.

But the first problem is what the summary doesn't contain, which is anything at all about the test methodology. There are two pieces of information that are always supplied when research laboratories describe a vehicle or engine emissions test, even in summary form: information on the test equipment and information on the test cycle. The Tennessee Tech summary includes neither. But apparently EPA staff did meet with Tennessee Tech staff to discuss details of the test protocol and the notes from the discussion were recently posted in the docket. The notes confirm that Tennessee Tech's test lab was unable to measure particulate emissions from diesel engines, even those that were not equipped with any particulate filter. Tennessee Tech's own description of their lab makes it clear that they are not

anywhere close to being equipped to follow certified emissions testing protocols that have been in place for decades. And it means that the "study" doesn't even empirically assess one of the two main harms from the explosion of glider sales that EPA intended to address—particulate matter emissions.

The EPA's concern in Phase 2 was regarding how much NOx and PM emissions from glider trucks would increase in the absence of a sales cap. Not only was Tennessee Tech unable to measure PM emissions, the summary doesn't report NOx emissions measurements from the "study" except to note that they ranged from 0.44 to 6.45 grams per horsepower-hour (g/HP*hr) — that is, between 2 times and 32 times the NOx limit for post-2010 engines! Not only does that not call into question EPA's Phase 2 assumptions; it confirms them.

The summary reports in detail only carbon monoxide measurements, which EPA didn't focus on. Apparently the Tennessee Tech "study" found no statistical difference between the CO emissions from new and remanufactured engines, which suggests that new and remanufactured engines of the same model year would have the same emissions levels—again, exactly in line with the assumptions made by EPA when calculating the potential emissions impact from glider trucks in the absence of standards.

So on the basis of a study done at an emissions testing lab that was unable to measure PM emissions, which measured NOx emissions as much as 32 times the limits in place since 2010, and which measured CO at levels that confirm the reasonableness of EPA's assumptions concerning emissions from new and remanufactured heavy diesel engines, the glider industry argues (and the Pruitt EPA seems prepared to agree) that “glider kit HDVs would emit less than 12% of the total NOx and PM emissions” for all Class 8 HDVs, not the one-third of all NOx and PM that EPA estimated. They give zero explanation of how they came to this conclusion—no information about what glider truck sales volume they assumed, no information about what NOx and PM emissions level they assumed for the glider trucks, and even no information about what year their calculations reflect.

A number of ways come to mind to characterize that kind of technical analysis. Here let me just say that nothing presented in the Tennessee Tech letter supports the glider industry's claim that the analysis for the Phase 2 rule was incorrect and assertion that glider trucks would emit a lower fraction of Class 8 NOx and PM emissions than EPA estimated initially. It's disappointing to contemplate that the Pruitt EPA's proposal to reverse that part of the Phase 2 rule could be based even in part on this sort of representation.

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Scott Pruitt's EPA wants to resurrect the dirty diesel

Posted Friday, 1 December 2017, 11:43

Rachel Muncrief and Josh Miller

Can't get enough of zombie movies? Well, get ready for a real-life version. Scott Pruitt's EPA is bringing the oldest and dirtiest diesel engines back from the dead—but disguising them in a shiny new host body. How? In the form of the innocuous-sounding glider truck.

From the outside, a glider looks like any other modern Peterbilt, Kenworth, Freightliner, or Western Star semi tractor. But look under the hood and things start to get terrifying. Inside you will find an engine that was thought to be long dead—an engine that emits uncontrolled levels of nitrogen oxides (NOx) and particulate matter (PM).

Make no mistake, the engines inside these glider trucks are literally killers. The American Cancer Society lists diesel exhaust as a Group 1 known carcinogen to humans, alongside things like asbestos and radiation. In addition to lung cancer, long-term exposure to diesel exhaust has been linked to stroke, heart disease, pulmonary disease, chronic respiratory illnesses, asthma, bronchitis, and infections. And these killers always pick off the weakest ones first: children, the elderly, the sick.

The EPA itself has many times acknowledged the harmful effects of diesel exhaust, and has gone to great lengths to tackle it. Thanks to EPA regulations, NOx and PM emissions from modern diesel engines are more than 90% below what they were 15 years ago. In just the past 10 years, EPA's actions have led to a greater than 50% drop in PM2.5 and NOx emissions from the country's on-road vehicle fleet. Put that a different way: about a third of the total PM2.5 reduction across all pollution sources since 2007, and more than half of the total NOx reduction, have come from

cleaning up heavy truck exhaust. As a result, air quality in the US has improved substantially: average concentrations of PM2.5 and ozone have dropped by 35% and 13% over that same time frame.

Such a record of success might make you think that those old killer diesel engines are a thing of the past. Wrong.

Scott Pruitt's EPA has proposed to allow the unfettered sale of glider trucks, reopening a loophole that the previous EPA administrator, Gina McCarthy, had sought to close. Sales of glider kits have increased exponentially in recent years because some unscrupulous but savvy entrepreneurs realized that there was a massive gap in the law: while it limited pollution from new engines, it did nothing to regulate emissions from these undead remanufactured engines when they were housed in new truck bodies. Glider trucks are sold at a 25 percent discount compared to trucks with modern engines, a huge incentive to their infiltration of the new vehicle fleet. That discount is ultimately paid for with human lives.

What would the Pruitt EPA's proposal mean for air quality? We ran the numbers, and the results are scary. According to the [EPA's own testing](#), a single glider truck emits 30 times the NOx and 60 times the PM of a modern truck. Sales of glider trucks today are around 10,000 per year—5% of the Class 7 and 8 tractor truck market—up an order of magnitude from 10 years ago. If these numbers continue to grow, even at a moderate level, Scott Pruitt's proposed regulation would expose US citizens to an additional 1.5 million tons of NOx and 16 thousand tons of PM emissions, equivalent to more than 12 billion dollars in health damages over the next decade. To put this into perspective, those additional NOx emissions are 13 times what the [impact of the Volkswagen fraud](#) in the United States would have been if all 482,000 VW diesel cars sold with defeat devices before the EPA and CARB put a stop to it were driven until they died of natural causes.

If Pruitt succeeds, the next time you're driving down the interstate and see what looks like a brand new tractor-trailer, keep an eye out for a plume of black smoke. Lurking beneath the hood could be one of the living dead.

Per-mile emissions of glider vehicles versus 2010 compliant vehicles

$\text{PM}_{2.5}$ (milligrams per mile)

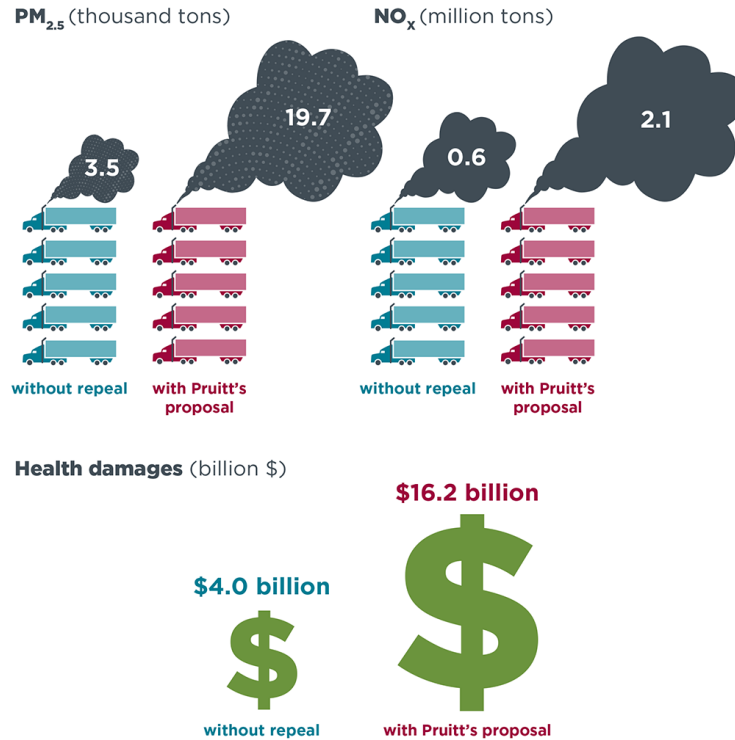


NO_x (grams per mile)



Per-mile emissions of glider vehicles versus 2010 compliant vehicles. Results are derived from chassis dynamometer testing conducted by US EPA's National Vehicle & Fuel Emissions Laboratory (November 20, 2017). Results reflect a 95% weighting of highway activity (55 and 65 mph cycles) and 5% weighting of transient activity (ARB transient) for a test vehicle with a combined weight of 60,000 pounds (including the tractor, trailer, and payload).

Cumulative emissions and health damages of Class 7 and 8 tractor truck sales over the next decade (2018-2027)



Cumulative emissions and health damages of Class 7 and 8 tractor truck sales over the next decade (2018-2027). Estimates without repeal assume glider vehicle sales without 2010 emissions compliant engines drop to 1,000 units per year from 2018 to 2020 and to zero starting in 2021. Estimates with Pruitt's proposal assume sales of glider vehicles with pre-2002 engines are permitted to grow from approximately 10,000 units per year in 2015 to 17,400 units per year in 2027 (10.4% of total sales). Annual total sales and vehicle-miles traveled by tractor-trailers are sourced from US EPA's Motor Vehicle Emission Simulator ([MOVES2014](#)). Monetized health damages (in billion 2017 \$) are equal to ICCT estimates of direct PM_{2.5} and NO_x emissions from Class 7 and 8 tractor trucks sold in 2018 and later, multiplied by US EPA estimates of damages per ton of direct emissions from on-road mobile sources in 2016. Damages in future years are converted to present value terms using a discount rate of 5% per year.

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[Glider industry petition in support of glider trucks debunks itself](#)

Legal Comments on EPA's November 2017 Proposal to Repeal Emissions Requirements for
Glider Vehicles, Glider Engines, and Glider Kits

EPA's 2017 proposal is grounded solely on the statutory interpretation that glider vehicles are not "new motor vehicles" for purposes of section 202 (a) (1) of the Act and therefore EPA is without authority to control pollutant emissions from the vehicles or their engines.¹⁰ The proposal is wrong. As discussed below, EPA possesses explicit authority to control pollutant emissions from the rebuilt heavy duty diesel engines used in glider vehicles under section 202 (a)(3)(D), which it exercised in the 2016 Final Rule to control emissions from rebuilt engines in glider vehicles.¹¹ In any case, the proposal to reinterpret the Act to say that glider vehicles are not new motor vehicles is devoid of legal merit.

I. EPA has authority to regulate Glider Vehicles as New Motor Vehicles

A. EPA's 2016 Final Rule

Section 216(3) of the Act defines "new motor vehicle" as "a motor vehicle the equitable or legal title to which has never been transferred to an ultimate purchaser." A glider vehicle clearly meets this definition - it is a motor vehicle, and the equitable or legal title to it has never been transferred to an ultimate purchaser. Glider vehicles are initially titled when sold to the ultimate purchaser, and are explicitly advertised as such. Glider vehicles are not a used vehicle whose owner has repair work done and keeps title to the vehicle. It is a unique and distinct vehicle never before assembled, sold, or owned. It is a combination of new components and used components, where the purchaser is the prior owner of neither the new components nor the

¹⁰ 82 FR 53442 (November 16, 2017) ("2017 Proposal").

¹¹ 81 FR 73478 (October 25, 2016) ("2016 Final Rule").

used components. No person has previously held title to this assembled vehicle for purposes other than resale. The assembled glider vehicle clearly satisfies the plain meaning of the definition of new motor vehicle.

This straightforward application of the definition of new motor vehicle is the only correct interpretation. Nothing in the criterion on passage of title to the ultimate consumer makes any reference to whether the components of the vehicle are new or used. The criterion is just passage of title, with no other limitation on the history of the components prior to passage of title. Where no ultimate consumer has ever had title to the vehicle, the vehicle is a new motor vehicle. That is the case for glider vehicles.

Other provisions in the definition also show that Congress intended a new motor vehicle could include used components. The definition is clear that a new motor vehicle may include a used engine.¹² The definition also covers all imported vehicles, clearly including used vehicles. On its face the definition of new motor vehicle is not limited to vehicles that have only new components and no used components.

EPA's interpretation clearly promotes the purposes of the Clean Air Act and its Title II provisions. Title II reflects Congress' intention to authorize EPA to establish a national motor

¹² EPA appears to argue this cannot be the case, because Congress routinely used the term new motor vehicle and new motor vehicle engine together. See 83 FR at 53446. However the definition of new motor vehicle engine is clear - a new motor vehicle can include an engine whose title has already been transferred to the ultimate purchaser. See CAA section 216 (3) and 81 FR at 73514, 73518. The agency simply asserts that since a glider vehicle cannot be a "new motor vehicle", a used engine installed in it cannot make a used engine a new one, dismissing the contrary position as "circular thinking". 82 FR 53446. This merely reiterates the agency's belief that a glider vehicle cannot be new. But the two-part definition of "new motor vehicle engine" necessarily means that an engine can be "new" even if previously sold if it is installed in a vehicle that is new in other respects. This includes a glider vehicle. Any other reading would distort the meaning of "any engine" to mean only "any new engine", eliminating a whole class of engines from the statutory definition in derogation of the normal tenets of statutory construction.

vehicle control program to address the serious and widespread problems of air pollution caused by motor vehicles. Congress recognized motor vehicles as major contributors to the Nation's air pollution problems, and provided broad, flexible, and comprehensive authorities to EPA to develop a national program to address this air pollution problem. The text of the definition of new motor vehicle reflects the broad scope of vehicles subject to EPA standard setting, and the standard setting provisions of section 202 provide the flexibility for EPA to develop appropriate solutions to this diverse and multi-faceted source of air pollution. EPA's 2016 Final Rule recognizes the very serious air pollution problem specifically attributable to glider vehicles and applies the definition of new motor vehicle in a straightforward way, allowing EPA to exercise its discretion and set reasonable and appropriate controls, taking into account the costs and other impacts on the regulated parties.

In the final rule, EPA properly interpreted the statutory language to mean exactly what it says, finding that glider vehicles are new motor vehicles. EPA's interpretation is consistent with Congress' clear intention and furthers the purposes of the Act. EPA is clearly authorized to adopt reasonable and appropriate controls for glider vehicles under section 202(a)(1) of the Act.

B.EPA's 2017 proposal

EPA's 2017 Proposal rejects this reasoned approach. Instead, EPA argues that "it would seem clear that Congress intended, for purposes of Title II, that a 'new motor vehicle' would be understood to mean ... a true 'showroom new' vehicle. It is implausible that Congress would have had in mind that a 'new motor vehicle' might also include a vehicle comprised of new body parts and a previously owned powertrain." 82 FR at 53446. EPA takes this view even though the proposal admits that glider vehicles are new motor vehicles based on the statutory criterion of first transfer of title to the ultimate purchaser. 82 FR at 53444, 53445. EPA reaches its

conclusion without any reference to or reliance on legislative history, other Clean Air Act provisions, or the Clean Air Act's statutory purposes. Instead, EPA relies on erroneous and improper approaches to statutory interpretation, which themselves do not support EPA's proposal, and fails to even discuss the statute's purposes.

EPA asks whether, at the time of enactment, Congress had the specific intention to include glider kits and vehicles or vehicles like them in the definition of new motor vehicles. In effect, EPA asks whether Congress specifically had glider kits and vehicles in mind when it adopted the definition of new motor vehicle.¹³ This is not a proper approach to statutory interpretation. The question for purposes of *Chevron* step 1 is not whether, at the time of enactment, Congress was consciously thinking about one fact specific, future application of a statutory definition that was designed to address potentially hundreds or more fact specific applications over many decades of implementation. The Supreme Court rejected this approach in *State of Massachusetts v. EPA*, 549 U.S. 497, 532 (2007) (“the broad language of [CAA] § 202(a)(1) reflects an intentional effort to confer the flexibility necessary to [address changing circumstances and scientific developments] ... [T]he fact that a statute can be applied in situations not expressly anticipated by Congress does not demonstrate ambiguity. It demonstrates breadth.”) The definition of new motor vehicle reflects this flexibility and breadth.

The appropriate question for purposes of *Chevron* step 1 is whether Congress expressed a clear intention on the broader issue of whether a new motor vehicle could include used

¹³ See 82 FR at 53445 (“whether or not Congress, in defining ‘new motor vehicle’ for purposes of Title II, had a specific intent to include within the statutory definition such a thing as a glider vehicle”) and (“[L]ikely that Congress did not have in mind that the definition would be construed as applying to a vehicle comprised of new body parts and a previously owned powertrain”), id. at 53446 (“[I]t is implausible that Congress would have had in mind that a ‘new motor vehicle’ might also include a vehicle comprised of new body parts and a previously owned powertrain”).

components. The statute indicates clearly that Congress specifically intended that new motor vehicles could include used components. As discussed above, the criterion of first transfer of title draws no distinction with respect to the kinds of components in the vehicle, the definition expressly states that used engines can be in a new motor vehicle, and used imported vehicles are considered to be new. EPA's interpretation in the 2016 Final Rule is consistent with this clear Congressional intent, and EPA's 2017 Proposal requiring "showroom new" vehicles is not.

EPA's 2017 Proposal also errs because it rejects the intention of Congress, expressed in the clear and straightforward language of the definition, based on extraneous materials with no ties to the legislative history or to other parts of the Clean Air Act. EPA relies on two claims: (1) there was limited use of glider kits at the time of enactment, therefore Congress could not have had them in mind when it adopted the definition of new motor vehicle, and (2) Congress' intention at the time of enactment must have been consistent with a separate labeling statute because of similarities in the definitions in the statutes. Neither of these sources is discussed anywhere in the legislative history, nor is there any evidence Congress ever considered them. They provide no basis to reject the straightforward evidence of Congressional intent provided by the actual statutory text.

The evidence provided by these extraneous sources, even assuming they are relevant, provide further support for EPA's interpretation in the 2016 Final Rule, not EPA's proposal. EPA first argues that Congress did not have glider vehicles in mind at the time of enactment because "[t]he manufacture of glider vehicles to salvage the usable powertrains of trucks wrecked in accidents goes back a number of years. But only more recently—after the enactment of Title II—have glider vehicles been produced in any great number." 82 FR at 53445.

However, the contemporaneous understanding at the time of passage of the Clean Air Act, even if relevant, was that glider vehicles were considered new vehicles. The Internal Revenue Service treated a glider vehicle as a new vehicle for federal excise tax purposes, which position was upheld on judicial review. See *Boise National Leasing, Inc. v. United States*, 389 F.2d 634, 636-37 (9th Cir. 1968).¹⁴ If anything, this shows Congress would likely have considered glider vehicles to be new motor vehicles when it enacted the CAA's definitions.

EPA next argues that similarity in the definitions used in the CAA and the Automobile Information Disclosure Act of 1958 (AIDA) shows that "Congress intended ... that a 'new motor vehicle' would be understood to mean something equivalent to a 'new automobile'—i.e., a true 'showroom new' vehicle."¹⁵ EPA's argument relies on flawed logic, and its analysis is superficial and incomplete. 82 FR 53446. Even if AIDA is relevant here the proposal ignores the other textual provisions of AIDA and how they interact, and does not consider the critical differences between the CAA and AIDA in text and Congressional purpose. These differences indicate that Congress did not adopt AIDA's narrow and limited approach, and instead adopted a broader more expansive legislative solution in CAA Title II.

First, EPA's reference to "showroom new" clearly refers to the showroom of a new car dealer. AIDA's legislative history indicates that this is the focus of AIDA. See *Baltimore*

¹⁴The Internal Revenue Service imposed an excise tax on manufacturers of new trucks made from glider kits. This tax applied when a "taxpayer purchased ... in packaged or "glider kit" form, all the necessary new elements, including frame, cab, brake system, etc. ... and then had the structuring and assembling processes done by a third party." The glider kit process resulted in a "new truck entity having been produced, and not a repairing or reconditioning of the old truck," and the manufacturer of the new truck entity was subject to the excise tax. 389 F. 2d at 636-37.

¹⁵ 83 FR at 53446.

Luggage Company v. FTC, 296 F. 2d 608 (4th Cir. 1961), decided several years before adoption of the CAA. The problem Congress addressed in AIDA was fraud and deception occurring in the showroom of new car dealers, and it crafted a narrow solution to address it. The result was a requirement for a window label for new cars shown by new car dealers in their showrooms. However this focus on dealers and their showrooms was not driven by AIDA’s definition of “new automobile,” but by other provisions of that law. That focus derives from a separate section, the requirement that manufacturers affix the window label to a new car prior to delivery of the vehicle to a dealer.¹⁶

In effect, Congress defined new automobile broadly in AIDA, but then narrowed the labeling requirement by limiting it to only those new automobiles delivered to new car dealers. For example, a new car sold directly by a manufacturer would not be subject to the labeling requirement. While that kind of distribution would not typically occur, this example makes clear that the definition of new automobile is not what ties AIDA to “showroom new” cars; a different section of the law achieves this result. The text of AIDA does not support EPA’s reasoning and conclusion, which relies on the AIDA definition by itself.

¹⁶ “Every manufacturer of new automobiles distributed in commerce shall, prior to the delivery of any new automobile to any dealer, or at or prior to the introduction date of new models delivered to a dealer prior to such introduction date, securely affix to the windshield, or side window of such automobile a label on which such manufacturer shall endorse clearly, distinctly and legibly true and correct entries disclosing the following information concerning such automobile” (emphasis supplied) 15 U.S.C. 1232. The enforcement for this labeling requirement is addressed in 15 U.S.C. 1233.

The CAA and AIDA differ in many important ways, and it is clear that in the CAA Congress did not take the narrow approach used in AIDA and did not focus on the subset of vehicles presented for show in new car dealer's showrooms.

(1) The CAA's Title II provisions address a much broader societal problem – air pollution problems, reaching broadly across the country - while AIDA addresses a specific consumer information problem involving just new car dealers.

(2) Unlike AIDA, the CAA's definition of new motor vehicle covers many more kinds of vehicles than passenger cars. The CAA covers all kinds of cars and trucks, from the smallest passenger car to the largest commercial tractor trailer. It covers many more kinds of manufacturers and their distribution networks, the ways in which new cars or trucks are sold to their buyers. The vehicles and their manufacturing and distribution networks are more varied than the limited world of manufacturer deliveries of passenger cars to new car dealers.

(3) Unlike AIDA, the definition of new motor vehicle is not limited to a line drawn based on the transfer of title to an ultimate purchaser. As explained above, the definition of new motor vehicle is broader in scope, and it is clear that a new motor vehicle may include an engine whose title has already passed to an ultimate purchaser, that is, a new motor vehicle may include a used engine. In addition, it includes all imported vehicles, new and used. Thus, on its face the definition of new motor vehicle is not limited to the kind of "showroom new" vehicles shown by new passenger car dealers.

(4) It is AIDA's manufacturer requirement that focuses AIDA on new car dealers' showrooms, not the definition of new automobile. The parallel manufacturer provision in the CAA, section 203(a), requires that a manufacturer obtain an EPA certificate of conformity before selling, offering for sale, introducing into commerce or delivering a new motor vehicle for introduction into commerce. Nothing narrows this prohibition or somehow limits Title II to vehicles delivered to a dealer for presentation in "showroom new" condition in their showroom. The CAA prohibition is much broader in scope than the labeling requirement in AIDA, properly reflecting the broader scope of the industries involved and the air pollution problem Congress was trying to solve.

Thus, even assuming without evidence that Congress was informed by AIDA, it is clear that Congress rejected the narrow AIDA approach and instead chose a broader and more expansive approach for the CAA.

The proposal maintains that the interpretation is "permissible" since "[a]t a minimum, ambiguity exists" in the statute. 82 FR at 53446. As explained above, there is no ambiguity and the statute directly contemplates that new motor vehicles can include used components, including non-new engines. But even assuming that this literal language does not compel EPA's reading in the 2016 Final Rule, the proposal fails to justify that the reinterpretation is "permissible" in terms of the statute's purposes. And for good reason. A permissible interpretation under *Chevron* step 2 must promote the statutory purposes of the provision and the statute being interpreted. See, e.g. *Council for Urological Interests v. Burwell*, 790 F. 3d 212, 222 (D.C. Cir. 2015) (an interpretation is permissible under *Chevron* step 2 if "it is a reasonable explanation of how an interpretation serves the statute's objectives"); *Northpoint Tech Ltd. v. FCC*, 412 F. 3d 145, 151 (D.C. Cir. 2005) (same). EPA makes no attempt to even consider

much less justify its proposed interpretation in terms of furthering the purposes of the Act and Title II. Most glaringly, EPA fails to consider or explain how a Congressional purpose of protecting the public health and welfare is promoted by leaving these ultra-high-polluting vehicles unregulated. EPA also fails to consider or justify its interpretation in terms of any of the purposes of the Act, and its proposed reinterpretation is impermissible on that ground alone.

In any case, there is no justification for EPA's proposal. It not only does not further the statutory purposes, it negates them. This proposal is antithetical to the core statutory objective of protecting public health and the environment from exposure to harmful emissions from motor vehicles, including from heavy duty vehicles and engines. See, e.g. CAA sections 202(a)(1), 202 (a)(3)(A) and (B); 202 (a) (3)(D); 213. It is likewise antithetical to the goals of attaining and maintaining the National Ambient Air Quality Standards by allowing unlimited, uncontrolled numbers of heavy duty vehicles emitting NO_x and PM at rates 40 to 450 *times* higher than new engines. Title II stands as evidence that Congress did not regard the NAAQS as an excuse not to curb dangerous vehicular emissions, but saw control of motor vehicle pollution as a critical element of the statute's NAAQS program.

The purpose of Title II is to broadly empower EPA to regulate pervasive motor vehicle air pollution, calling for EPA to control it at its source when the vehicle is first manufactured. The broad scope of the kinds of vehicles covered is matched with clear discretion to adopt reasonable controls that are appropriate under the specific circumstances. EPA's proposed interpretation does the opposite – it would require EPA to ignore a very large and growing source of harmful air pollution from motor vehicles, and would strip EPA of any ability to address this problem through reasonable controls on the manufacturer of these new vehicles under CAA section 202(a)(1). Whether or not one agrees with the specific controls EPA adopted

in the 2016 Final Rule is not the issue. The issue is whether the purposes of section 202(a)(1) of the Act are promoted by totally precluding EPA from addressing in any fashion a major and growing source of motor vehicle air pollution, where the vehicles clearly meet the terms of the definition adopted by Congress. EPA's 2016 Final Rule properly promoted the purposes of the Act, but the agency's 2017 Proposal does just the opposite.

Finally, EPA's 2017 Proposal ignores the breathtakingly destructive consequences of its proposed reinterpretation. If a "new motor vehicle" is limited to vehicles that consist entirely of new parts, as EPA determines, then simply installing one or more used parts on an otherwise new motor vehicle would allow manufacturers to avoid all Title II requirements.¹⁷ In addition to eviscerating all potential for controls over glider vehicles under section 202(a)(1), the proposal could eviscerate the remainder of Title II motor vehicle controls as well. Such an absurd result demonstrates the impermissibility of the proposed reinterpretation.

C. Conclusion

In short, the statute is unambiguous that glider vehicles are new motor vehicles. Even if the statute were ambiguous, the proposed reinterpretation is not permissible because it is directly contrary to the terms of the statute, the intention of Congress as expressed in the definition it adopted, and the core statutory objective of protecting public health and the environment from exposure to air pollution caused by motor vehicles, including heavy duty diesel vehicles and engines, through reasonable regulation of the manufacturers of new vehicles and engines.

II. EPA Has Explicit Authority to Regulate Emissions from rebuilt Heavy Duty Diesel Engines, and did so in the 2016 Final Rule

¹⁷ Among others, the Engine Manufacturers Association noted this drastic consequence of the proposal in its December 4, 2017 public hearing testimony opposing the proposal.

Separate and apart from EPA's authority under Section 202(a)(1), EPA's assertion that it lacks authority over emissions from glider vehicles and engines is flatly wrong as the Act provides explicit authority to adopt regulations to control emissions from rebuilt heavy duty diesel engines. There is no dispute that glider vehicles use exclusively rebuilt heavy duty diesel engines. See, e.g. 81 FR 73518 n. 93 and RTC pp. 1879-1880. Section 202 (a)(3)(D) of the Act provides that "[t]he Administrator shall study the practice of rebuilding heavy-duty engines and the impact rebuilding has on engine emissions. On the basis of that study and other information available to the Administrator, the Administrator may prescribe requirements to control rebuilding practices, including standards applicable to emission from any rebuilt heavy-duty engines ... which in the Administrator's judgment cause, or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare taking costs into account." EPA is also to consider lead time, cost of compliance, energy and safety factors. *Id.*

As the agency notes, EPA has previously adopted controls under this authority, (properly) citing 40 CFR section 1068.120; see also 86.004-40. 82 FR 53443 and n.2. However the proposal ignores that EPA also exercised this rebuild authority as a separate basis for the 2016 Final Rule on glider vehicle engines. See e.g. 81 FR 73518/1; 73519/1-2; 73944 n. 991; 73945/3; Response to Comment Background Document ("RTC") p. 1879. Therefore, the agency cannot revoke the provisions of the 2016 Final Rule concerning glider vehicle engines without revoking its prior exercise of the rebuild authority. EPA has nowhere indicated that it is revoking this prior exercise of rebuild authority, and has totally failed to explain or justify such an action, a fatal substantive and procedural deficiency. See *State Farm*, 463 U.S. at 42 ("an agency changing course must supply a reasoned explanation for the change beyond that which may be required when an agency does not act in the first instance"), and 43 (agency acts

arbitrarily when it “entirely failed to consider an important aspect of the problem”). No reasoned explanation for revoking this exercise of authority exists.

In short, EPA supported its 2016 Final Rule with a compelling justification, and there is no basis for EPA to revoke its exercise of authority over emissions from rebuilt diesel engines in glider vehicles. EPA’s failure to consider this issue is itself arbitrary, and necessitates a reproposal should the agency still seek to amend any feature of the 2016 Final Rule to alter its substantive terms.